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Ontology Evolution in Law: (Extended Abstract)

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Abstract

We are exploring ontology evolution in the legal domain, by modeling the interpretation of open-textured statutory concepts in a legal case. This requires representing, and reasoning about, the mappings between a statutory context, a real-world context, and the various legal, social, and ethical contexts involved in a legal case. We are using contextual logics to formalise the process of legal theory construction.

The aim of our research is to explore computational models of ontology evolution in the legal domain¹. We define ontology evolution as the changes that occur to a conceptualisation of a domain held by an agent, or a group of agents, through the interaction between the agent and the domain. The questions that our research is trying to address include: what changes can occur, why do these changes occur, and how do these changes occur? We are using the legal domain to explore ontology evolution since there are many well-documented, historical cases which can be used as case studies.

There are many forms of ontology evolution that occur in the law, with different ontologies being changed, for example: the change to the structure of the legal system when new courts are created, the changes to our commonsense understanding of the world which affect the law, changes to our values, or changes through the introduction of new laws. We are looking at the changes to the meaning of statutory concepts that occur as a result of their interpretation in specific legal cases. In particular, we are studying cases where the interaction between different legal systems can influence the interpretation of a statutory concept. For example, the interpretation of an enactment of a European Directive in one country might be influenced by the interpretation of an enactment in another European country.

An example of this form of ontology evolution exists in the case of *James Buchanan and Co Ltd v. Babco Forwarding and Shipping (UK) Ltd* (Buchanan v. Babco). The case involved the theft of a shipment of whisky in the U.K. whilst it was being transported from Scotland to Iran. Since the whisky was stolen in the U.K., the distillers (Buchanan) were liable for excise duty of £30,000 on it, the whisky was being sold for £7000. Had the whisky left the U.K., as planned, then no excise duty would have been levied. The distillers wanted compensation for the excise duty and the cost of the whisky from the carrier (Babco), since the whisky was only stolen due to the negligence of the carrier's lorry driver. The relevant Act of Parliament allowed compensation for the "current market price" of the goods, and for "other charges incurred in respect of carriage". The question in the legal case was whether either "current market price" or "other charges incurred in respect of carriage" included the excise duty.

The basic problem in statutory interpretation is that legal concepts are open-textured², there are borderline cases about which we are uncertain about whether the concept applies or not. In Buchanan v. Babco "current market price" does not obviously include excise duty since there are two notions of market: the domestic market (where the price would include excise duty) and the international market (where the price does not include excise duty). The problem of the open-texture of legal concepts is recognised within the AI and Law community [4] as a challenge to computational modeling of legal reasoning.

We view the problem of statutory interpretation in terms of the "bridge rules" between different contexts in a contextual logic [1]. This allows us to reason about how the interpretation of statutory concepts is affected by the various contexts in which they are interpreted. The importance of context to understanding how legal rules are used within a legal system is well known to lawyers [5].

Following work in AI and Law [4], we model legal reasoning as a process of theory construction. A lawyer must create a theory which relates the statutory context to the real-world context (the facts of the case) bearing in mind the legal, social

¹there is also work on ontology evolution in physics in our research group [2]

²The classic example is "No vehicles in the park", the concept of vehicle is open-textured since it isn't clear whether it would include "vehicles" like ambulances or skateboards

and ethical contexts within which this interpretation occurs. This theory must also satisfy the goal of the lawyer, winning the case for their client.

For example, in *Buchanan v. Babco* there was an international context to the case. The relevant Act of Parliament was the U.K. enactment of an international convention. This led to debate about how (or even if) the French language version of the convention could be used to disambiguate the U.K. Act, and whether Foreign case law was relevant to the U.K. courts. So the problem of whether $current-market-price(whisky) = 37000$ or $current-market-price(whisky) = 7000$ might depend upon arguments about the interpretation of the French version of the convention.

The kinds of ontological changes to legal concepts that we are interested in include the change to the concept of “current market price” in *Buchanan v. Babco*. In this case, the lawyers recognised that there was a conflict between our commonsense intuition that there is a unique market price for a good and the existence of two distinct markets (domestic and international), with distinct prices, in the real-world situation. The judges refined the meaning of the statutory concept of “current market price” to be dependent upon the destination of the goods, and “other charges incurred in respect of carriage” to include the excise duty. These changes could be modeled in a similar manner to ontology evolution in physics [2] and dynamic ontology repair [3].

Clearly, there are many problems to be solved in this work. Firstly, the reasoning and representation framework for contextual theory construction needs to be formalised. We have been looking at argumentation frameworks and abductive reasoning as a way of characterising the process of theory construction. Secondly, there is a significant commonsense-knowledge problem with creating the relevant background knowledge to model a legal case. Ontologies which capture the legal, social and ethical contexts of the law do not exist, it will be necessary to create these ontologies to explore specific cases. This presents a difficulty for the applicability and evaluation of the research, but the problem of ontology evolution is a significant and necessary research challenge which demands this exploration.

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